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DISAPPEARING FORESTS: DRAINING THE EARTH'S GENETIC RESERVOIR

by NORMAN MYERS

Tropical moist forests are by far the richest ecological zone on earth. It is also the least explored by science: we now know more about certain patches of the moon's surface than we do about many parts of these forests. Furthermore, tropical moist forests are being over-exploited and generally degraded more rapidly than any other biome. Many authoritative scientists believe that, by the end of the century, much of the biome will have been reduced to impoverished remnants if not destroyed altogether.

At a casual glance, an active agent in the excessive exploitation of tropical moist forests often seems to be the on-the spot logger. Extracting 60-100 cu.m. of timber per hectare in Southeast Asia, he leaves behind a forest where between one third and two thirds of the residual trees are damaged beyond recovery. In short, he leaves behind a basically different kind of forest, and a pretty impoverished one.

But much of the exploitation is carried out by transnational timber corporations based in North America, Japan and Europe that supply the capital, skills and technology without which Indonesia, the Philippines, the Ivory Coast and many other countries would not be able to exploit their forest resources at such headlong rates. More important, they are responding to demands from affluent nations. During the past 30 years, there has been a steadily growing demand on the part of the developed world for the kinds of timber that make up over 90 percent of tropical moist forests. In 1950, the developed world imported 4.2 million cu.m. of tropical hardwoods, and in 1973, 53.3; they are projected to take as much as 95 million by the year 2000.

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Dr Norman Myers, a Consultant in Environment and Development based in Nairobi, has worked with the FAO, the Rockefeller Foundation and the U.S. National Academy of Sciences. He has recently published a book dealing with the problem of disappearing tropical forests.

A second example of foreign-inspired exploitation of tropical forestlands is the cattle rancher, particularly in Latin America. Affluent countries are increasingly looking for beef at "cheap" prices. In order to meet this demand, forests in several countries of Central America and in the eastern sector of Brazil's Amazonia are being cleared to make way for artificial grasslands.

A third leading agent in this scene of mis-use and over-use of tropical moist forests is the slash-and-burn cultivator. Their numbers have increased to a point where they find themselves with insufficient space, whereupon they make intensive as well as extensive demands of forests. Local ecosystems can no longer regenerate themselves. One way to tackle the problem is to boost the sustainable productivity of croplands. This requires a number of inputs, however, notably fertilizer. But because fertilizer prices worldwide have soared and remain high due to excessive fertilizer demand on the part of affluent nations, the forest farmer sees less prospect of improving his production.

In view of the "economic-ecologic linkages" between persons chopping down forests in the tropics and people living thousands of kilometres away, one may well ask, "Whose hand is really on the axe?"

The decline of tropical moist forests will have many and varied consequences. First of all, the tropical countries in question will lose a source of potentially renewable foreign-exchange earnings. Tropical wood exports now amount to about 4 percent of the value of all developing-world exports excluding oil, making it one of the five most important export commodities produced by the developing world.

Secondly, elimination of these forests can trigger an "ecological backlash", both at local and global level. Especially important are watershed repercussions of deforestation. Forty percent of developing-world farmers live in valleylands and so they depend heavily on the "sponge effect" of forests in surrounding catchment areas. When forests disappear, rainy-season supplies of water tend to be released in floods, followed by months-long droughts. In addition, deforestation leads to soil erosion, causing sedimentation of water reservoirs and hydropower installations. Reservoirs

in the Philippines, Pakistan, Ecuador and Colombia are now estimated to be losing their capacity within half their projected life spans. In Thailand, waterways have become too choked with silt debris to be navigable.

These consequences are scarcely more important than the impending loss of a large portion of the earth's stocks of species. Of the 5 to 10 million species that are believed to exist on earth, as many as 40 to 50 percent are thought to live in tropical moist forests. The next few decades could see the elimination of at least one million species in these forests. This represents an irreversible loss of unique resources of humanity's natural heritage.

There are strong economic factors in favour of safeguarding species. To consider agriculture first, tropical moist forests have supplied the origins of many staple foods, notably rice, millet, cassava, pigeon pea, mung bean, yam, taro, banana, pineapple and sugarcane, to name but the better known. A huge cornucopia of other foods waits to be investigated. In Indonesia alone, for example, some 4000 plant species are thought to have proved useful to native peoples as food, yet less than one tenth have come into wide use.

Moreover, tropical moist forests contain many wild relatives of modern food crops -- crops that, being the refined products of genetic engineering, require constant "topping up" with fresh germ plasm in order to resist new types of diseases and pests, environmental stresses, and the like, as well as to increase productivity and nutritive content. During this century, genetic resources from tropical forests have saved a number of important crops, including bananas, sugarcane, cocoa and coffee.

In addition to providing a hefty boost to agriculture, tropical moist forests are earth's main repository of drug-yielding plants. At least 70 percent of the 3000 species of plants that are known to possess anti-cancer properties exist in the tropics, mainly in tropical moist forests. The rhizomes of a forest-zone vine, the Mexican yam (*Dioscrorea composita*), yield virtually the world's entire supply of diosgenin, from which a variety of sex hormone combinations are prepared, including "the pill". Current sales

of Mexican yam materials for contraceptive pills amount to $7 million per year, and across-the-counter sales for final products total $700 million.

A third category of products is derived from tropical moist forests -- specialist materials for industrial use. From Southeast Asia's forests alone come latex, gums, camphor, dammor, resins, dyes, and ethereal oils. Many forest plants bear oil-rich seeds, such as the Babassu palm (*Orbignya martiana*), the Seje palm (*Jessenia polycarpa*), several species of the *Caryocar* genus, and a number of other trees that grow wild in Amazonia. The Babassu's fruit contain up to 72 percent oil, which can be used to produce fibres, cattlefeed, soap, detergents, starch and general edibles, and can serve as a substitute for diesel oil.

Yet another valuable "resource" is likewise headed for oblivion: the large number of forest-dwelling tribes who still pursue their traditional way of life. In 1900 there were 230 tribal groups living in Brazil's sector of Amazonia, totalling 1 million people. Now there are only 143 groups numbering 50,000 people. The demise of forest peoples is all the more regrettable in that they represent a fund of experience whose value can hardly be estimated. For example, the Amerindians of Amazonia know of 750 plant species with medicinal properties.

All in all, it seems a statistical certainty that genetic reservoirs of tropical moist forests contain source materials for many new foods, improved crops, pesticides, medicines and industrial goods. Provided the wild species in question survive, benefits could accrue to the whole of mankind in perpetuity.

If current rates of mis-use and over-use continue, let alone accelerate, there may be little left of tropical moist forests within another 3-5 decades. This is roughly the time-span during which the earth's estimated oil deposits are projected to run out. Thus two critical resources are due to be exploited to exhaustion within the foreseeable future: it is difficult to know which could have the more serious repercussions for humanity's long-run welfare.

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